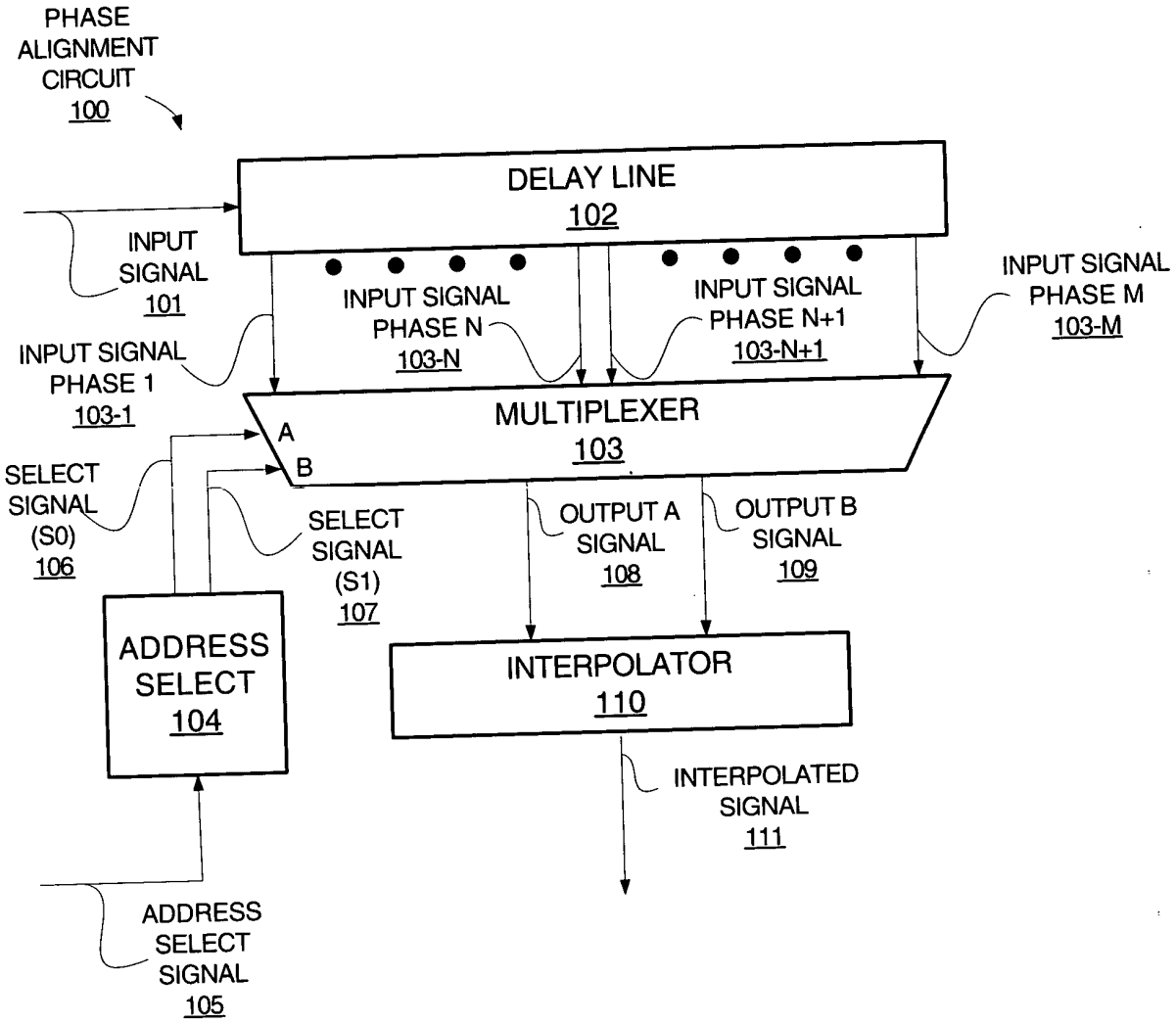
PHASE ALIGNMENT CIRCUIT 100
DELAY LINE 102
INPUT SIGNAL 101
INPUT SIGNAL PHASE 1 103-1
INPUT SIGNAL PHASE N 103-N
INPUT SIGNAL PHASE N+1 103-N+1
INPUT SIGNAL PHASE M 103-M
MULTIPLEXER 103
A
B
SELECT SIGNAL (S0) 106
SELECT SIGNAL (S1) 107
OUTPUT A SIGNAL 108
OUTPUT B SIGNAL 109
ADDRESS SELECT 104
INTERPOLATOR 110
INTERPOLATED SIGNAL 111
ADDRESS SELECT SIGNAL 105

FIG. 1A

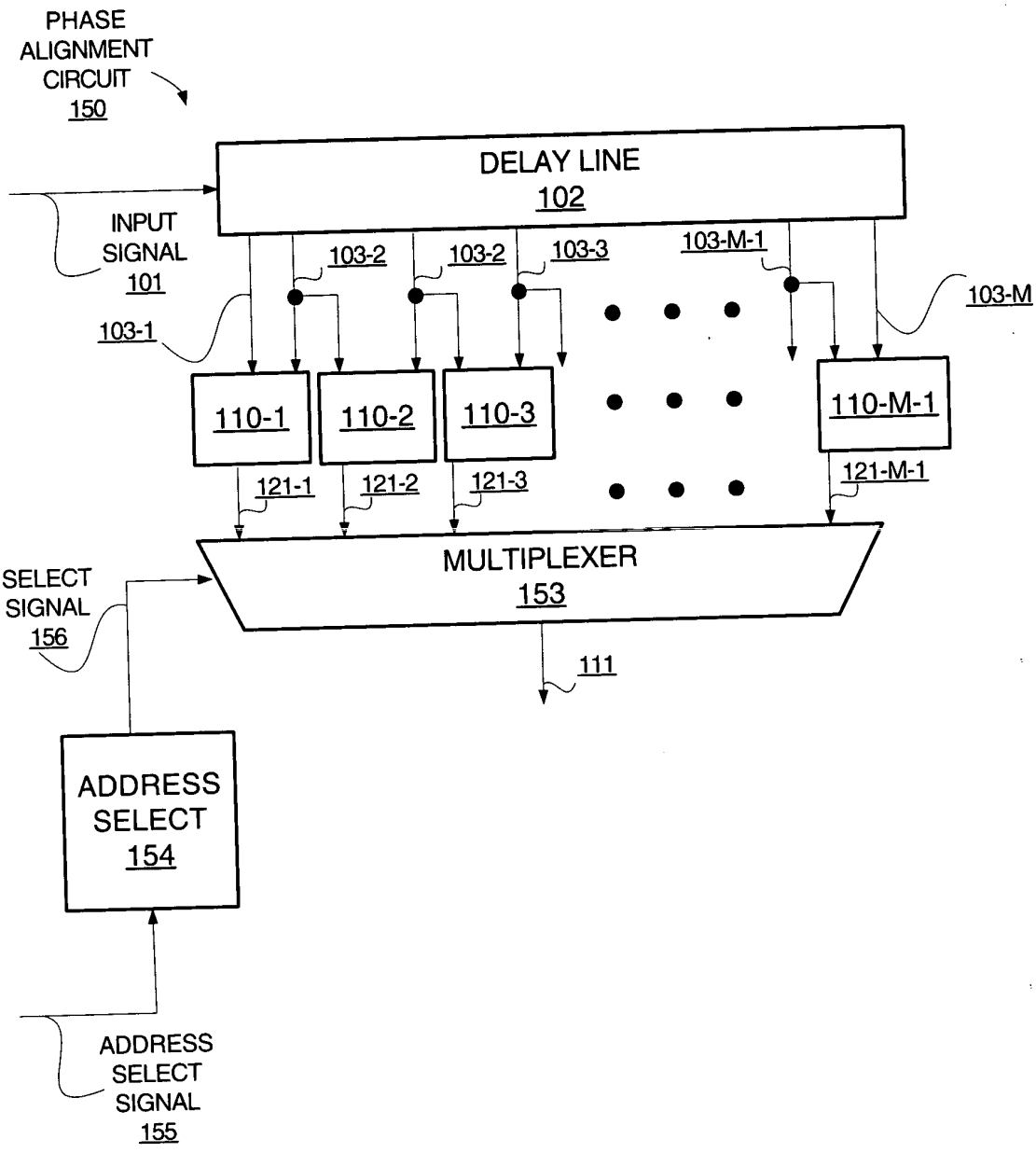
PHASE
ALIGNMENT
CIRCUIT
150
DELAY LINE
102
INPUT
SIGNAL
101
103-1
103-2
103-2
103-3
103-M-1
103-M
110-1
110-2
110-3
110-M-1
121-1
121-2
121-3
121-M-1
MULTIPLEXER
153
SELECT
SIGNAL
156
111
ADDRESS
SELECT
154
ADDRESS
SELECT
SIGNAL
155

FIG. 1B

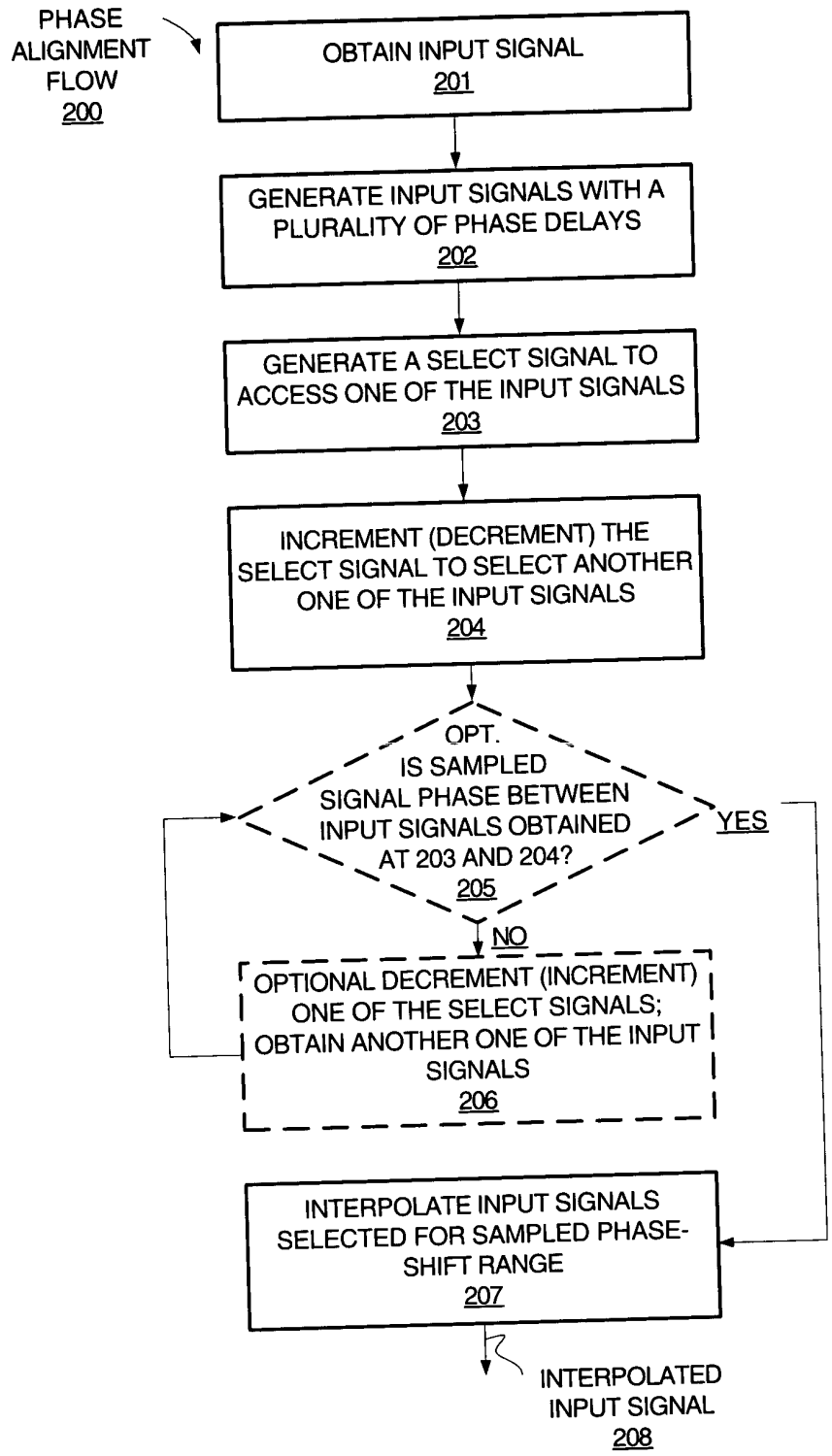
PHASE ALIGNMENT FLOW 200
OBTAIN INPUT SIGNAL 201
GENERATE INPUT SIGNALS WITH A PLURALITY OF PHASE DELAYS 202
GENERATE A SELECT SIGNAL TO ACCESS ONE OF THE INPUT SIGNALS 203
INCREMENT (DECREMENT) THE SELECT SIGNAL TO SELECT ANOTHER ONE OF THE INPUT SIGNALS 204
OPT. IS SAMPLED SIGNAL PHASE BETWEEN INPUT SIGNALS OBTAINED AT 203 AND 204? 205
YES
NO
OPTIONAL DECREMENT (INCREMENT) ONE OF THE SELECT SIGNALS; OBTAIN ANOTHER ONE OF THE INPUT SIGNALS 206
INTERPOLATE INPUT SIGNALS SELECTED FOR SAMPLED PHASE-SHIFT RANGE 207
INTERPOLATED INPUT SIGNAL 208

FIG. 2A

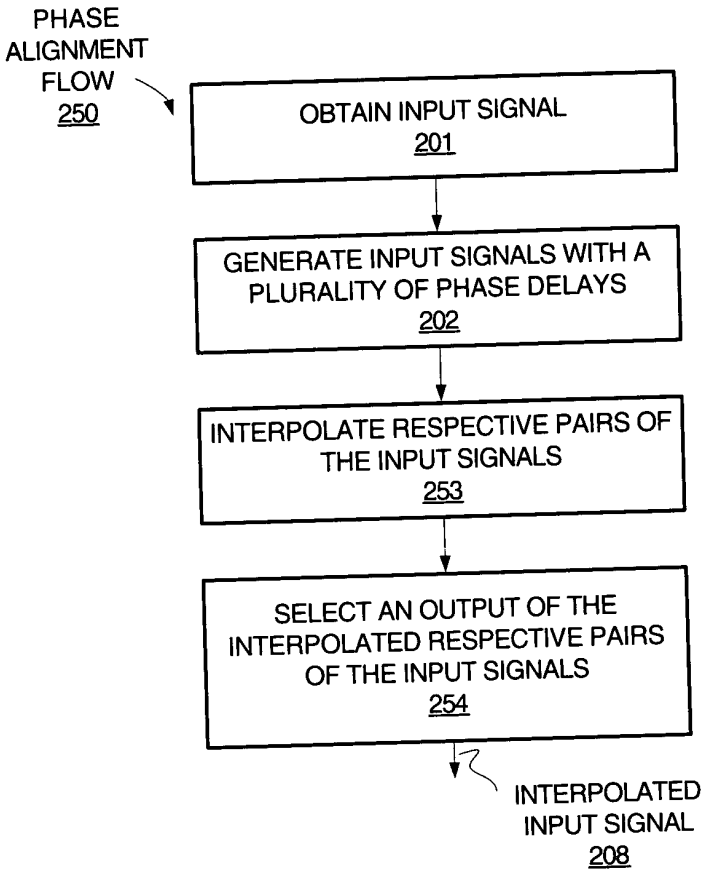
PHASE ALIGNMENT FLOW 250
OBTAIN INPUT SIGNAL 201
GENERATE INPUT SIGNALS WITH A PLURALITY OF PHASE DELAYS 202
INTERPOLATE RESPECTIVE PAIRS OF THE INPUT SIGNALS 253
SELECT AN OUTPUT OF THE INTERPOLATED RESPECTIVE PAIRS OF THE INPUT SIGNALS 254
INTERPOLATED INPUT SIGNAL 208

FIG. 2B

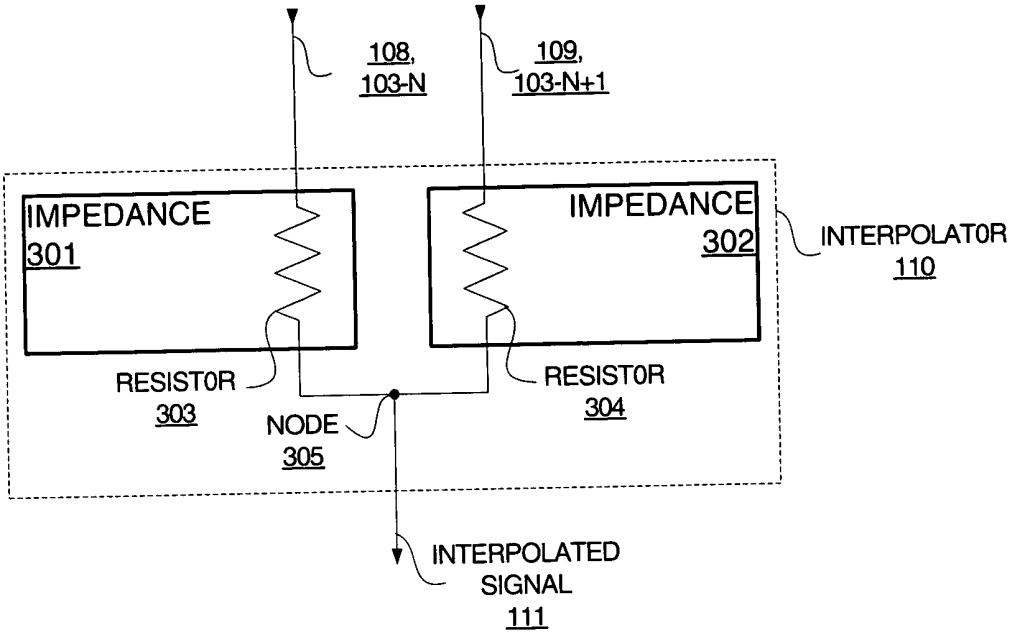
108,
103-N
109,
103-N+1
IMPEDANCE
301
IMPEDANCE
302
INTERPOLATOR
110
RESISTOR
303
NODE
305
RESISTOR
304
INTERPOLATED
SIGNAL
111

FIG. 3A

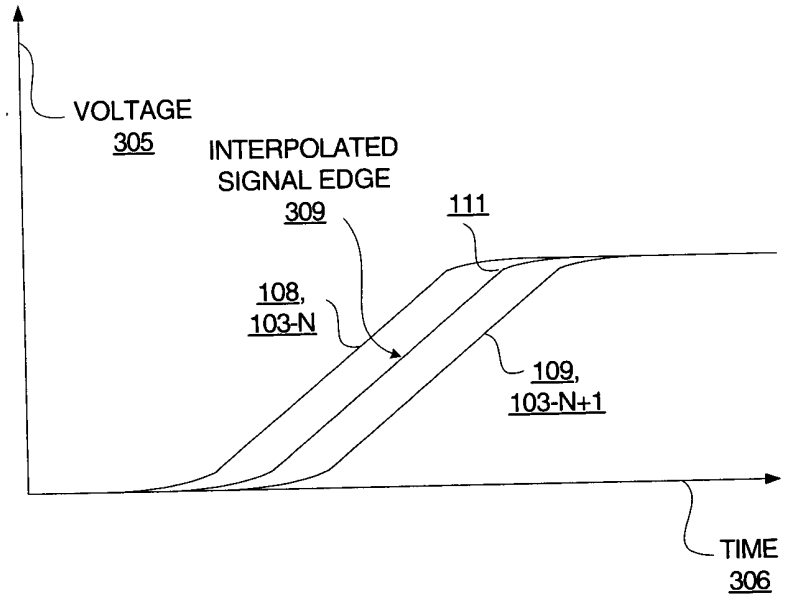
VOLTAGE
305
INTERPOLATED
SIGNAL EDGE
309
111
108,
103-N
109,
103-N+1
TIME
306

FIG. 3B

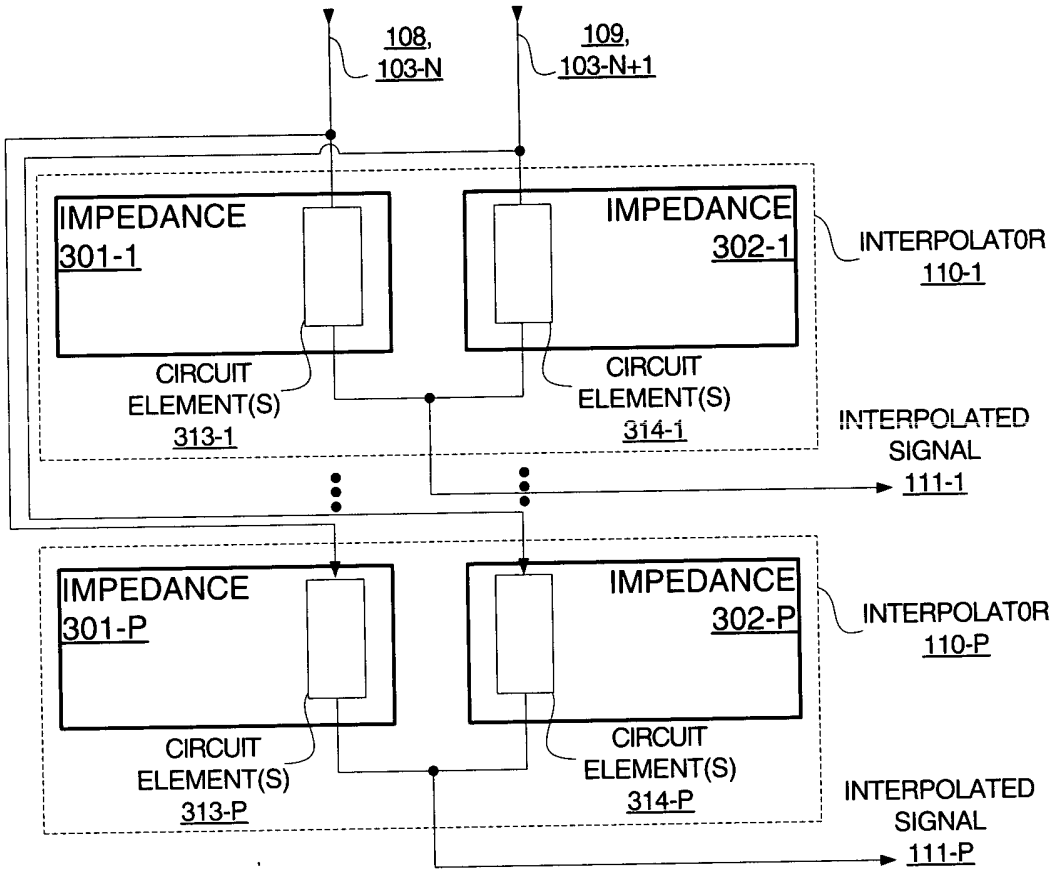
108,
103-N
109,
103-N+1
IMPEDANCE
301-1
IMPEDANCE
302-1
INTERPOLATOR
110-1
CIRCUIT
ELEMENT(S)
313-1
CIRCUIT
ELEMENT(S)
314-1
INTERPOLATED
SIGNAL
111-1
IMPEDANCE
301-P
IMPEDANCE
302-P
INTERPOLATOR
110-P
CIRCUIT
ELEMENT(S)
313-P
CIRCUIT
ELEMENT(S)
314-P
INTERPOLATED
SIGNAL
111-P

FIG. 3C

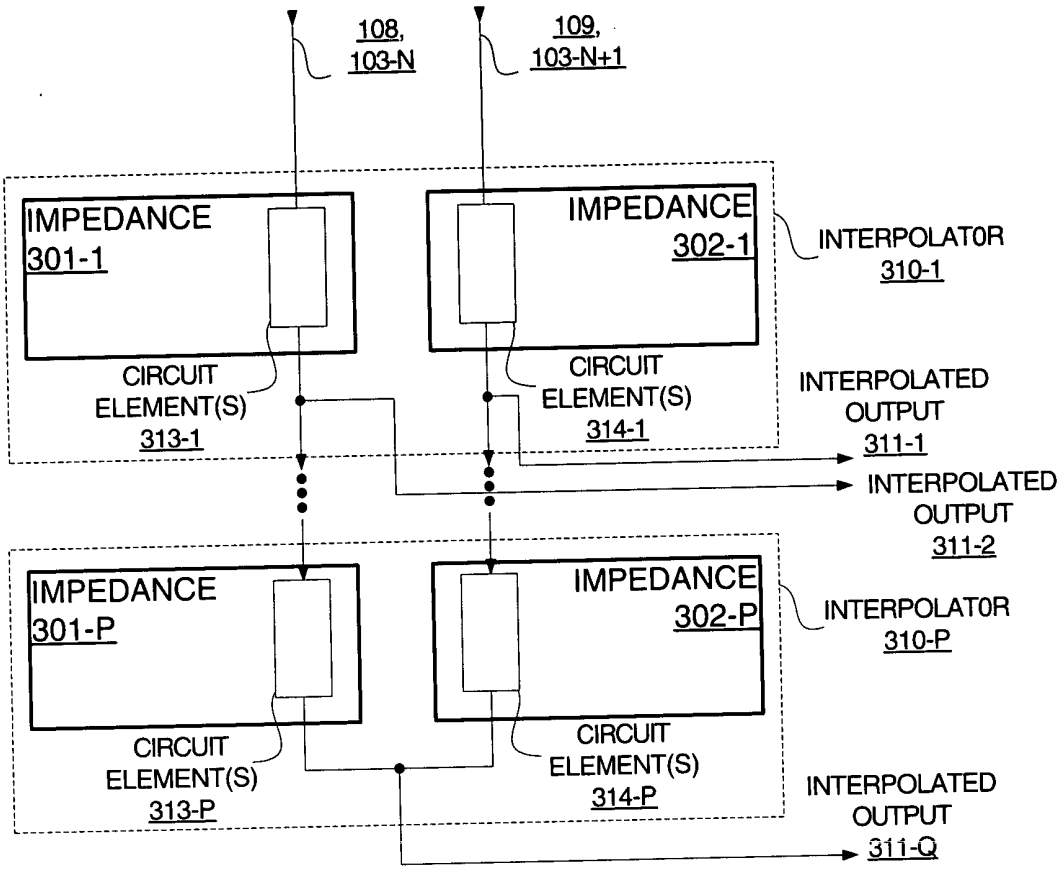
108,
103-N
109,
103-N+1
IMPEDANCE
301-1
IMPEDANCE
302-1
INTERPOLATOR
310-1
CIRCUIT
ELEMENT(S)
313-1
CIRCUIT
ELEMENT(S)
314-1
INTERPOLATED
OUTPUT
311-1
INTERPOLATED
OUTPUT
311-2
IMPEDANCE
301-P
IMPEDANCE
302-P
INTERPOLATOR
310-P
CIRCUIT
ELEMENT(S)
313-P
CIRCUIT
ELEMENT(S)
314-P
INTERPOLATED
OUTPUT
311-Q

FIG. 3D

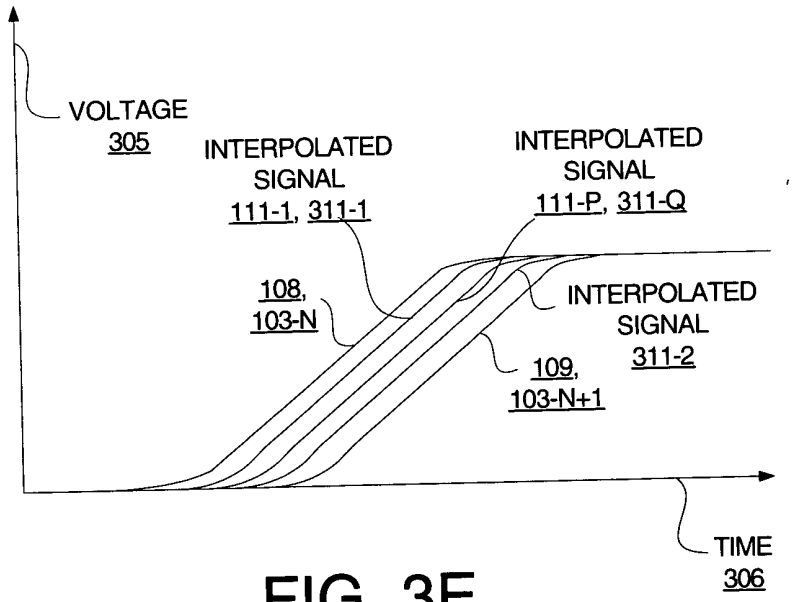
VOLTAGE
305
INTERPOLATED
SIGNAL
111-1, 311-1
INTERPOLATED
SIGNAL
111-P, 311-Q
108,
103-N
INTERPOLATED
SIGNAL
311-2
109,
103-N+1
TIME
306

FIG. 3E

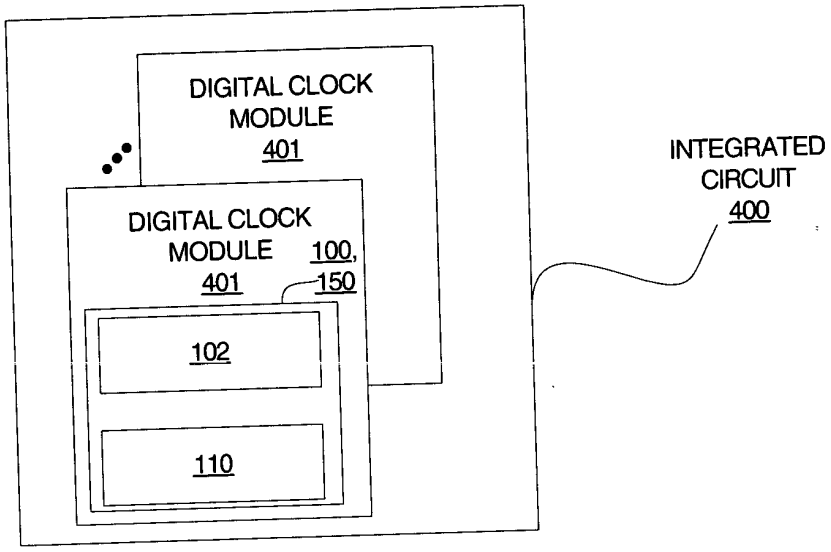
DIGITAL CLOCK MODULE 401
DIGITAL CLOCK MODULE 401
100, 150
102
110
INTEGRATED CIRCUIT 400

FIG. 4